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EP A1 0165443

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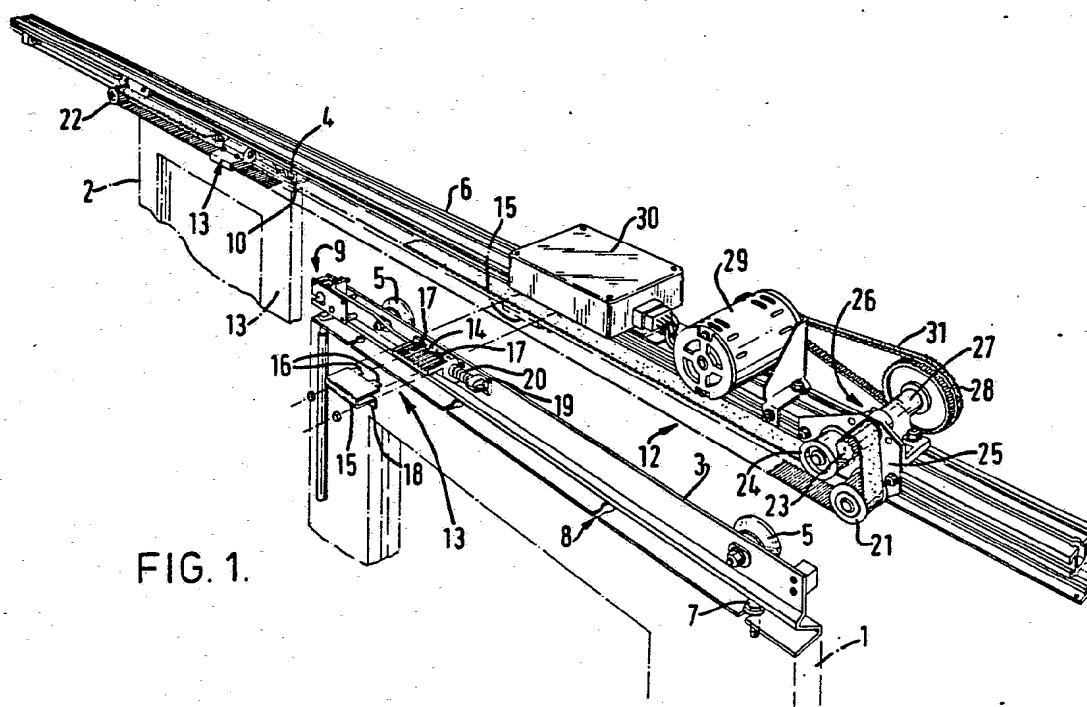
E2M

Selected US specifications from IPC sub-class

E05F

## (54) Sliding door drive

(57) A door assembly comprises two doors (1, 2) coupled to carriages (3, 4) which run on a track (6) and which are coupled to respective runs of an endless belt (12). The doors are moved towards and away from one another by driving the endless band. To this end a drive wheel (23 or 21) engaged with the endless band is driven by a prime mover (29) via a simple band and sprocket wheel drive arrangement (31/28).



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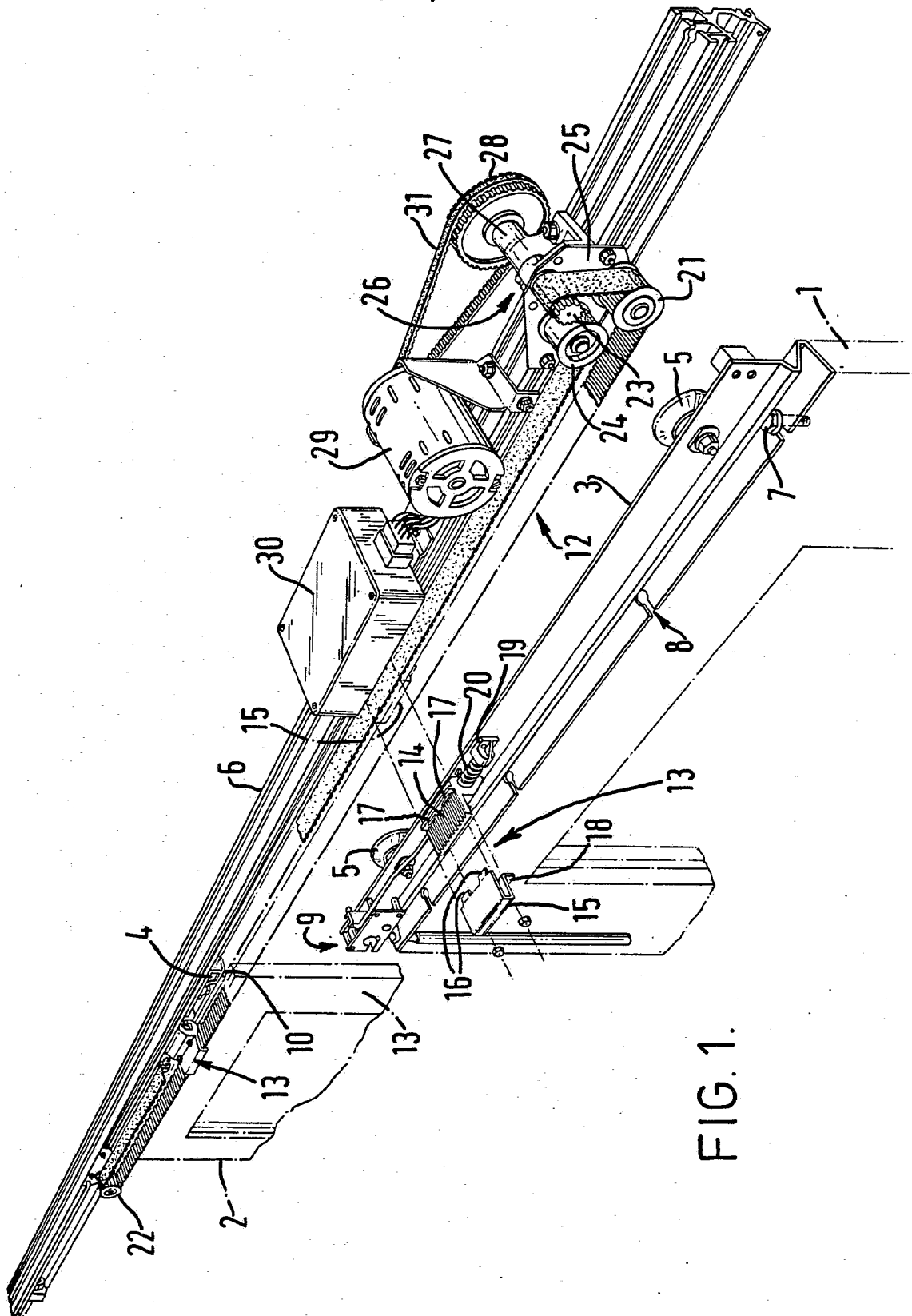




FIG. 3.

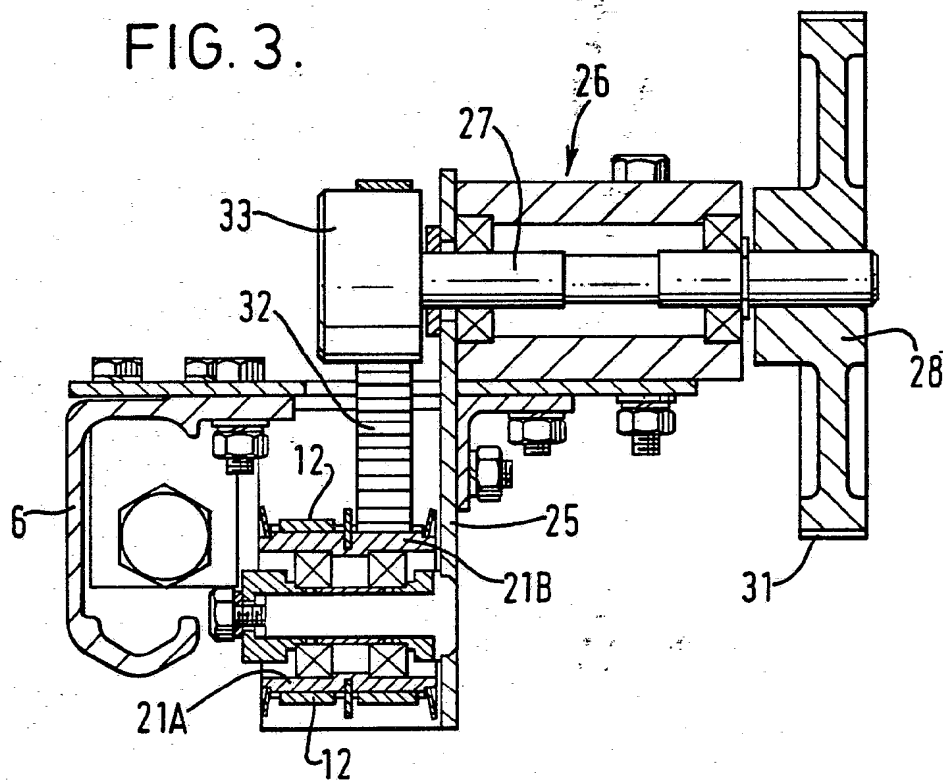


FIG. 4.

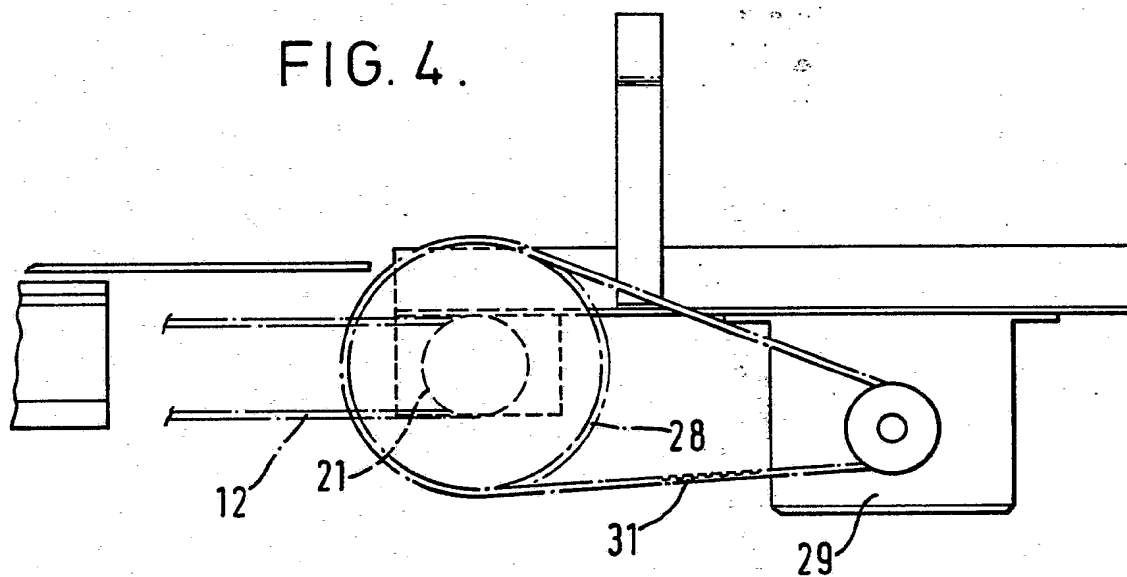
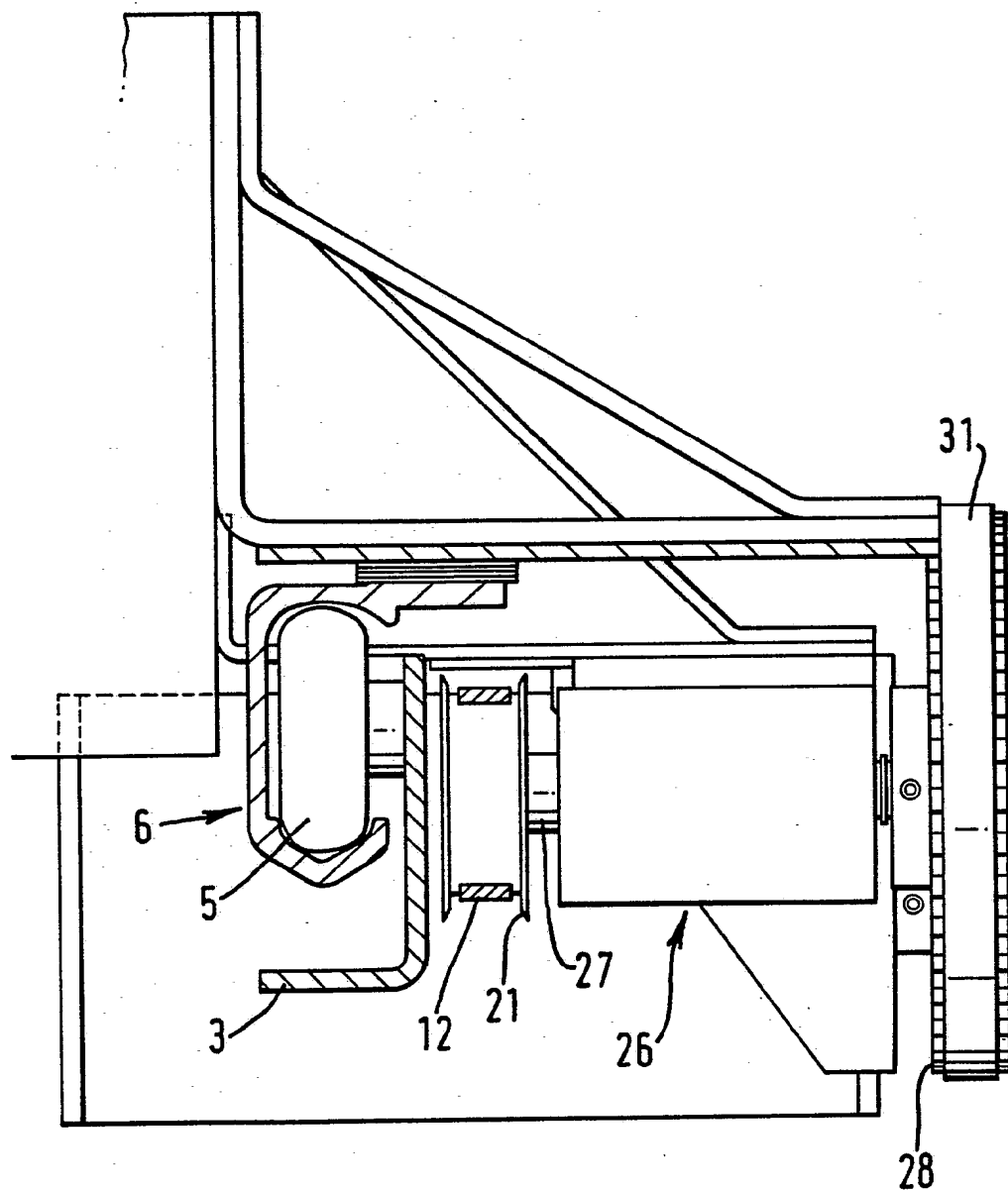


FIG. 5.



DOOR ASSEMBLIES

This invention relates to door assemblies and is particularly concerned with door assemblies in which at least one door is movable transversely of the doorway for opening and closing the doorway. Drive for  
5 effecting such movement can be provided by a piston and cylinder arrangement but where lengthy travel of the door is required this arrangement has to be of large stroke and hence relatively massive construction, leading to high construction costs and difficulties in  
10 mounting the arrangement in sufficiently rigid fashion. Motor driven gearing can be employed, but this gearing has to be of complex nature to achieve satisfactory transmission of power from the motor.

15 According to the present invention there is provided a door assembly comprising at least one door movable transversely of a doorway for opening and closing the doorway; a carriage coupled to the door and movable along a track extending transversely of the  
20 doorway; an endless band having two runs extending in the direction along the track, the carriage being coupled to one of these runs; and drive means for driving the endless band, this drive means comprising a drive wheel engaged with the endless band to drive the  
25 endless band and a prime mover connected to drive the drive wheel via a band and sprocket wheel drive arrangement. In this assembly the transmission of power from the prime mover to the drive wheel to drive the endless band to move the door is achieved by a band  
30 and sprocket wheel drive arrangement which can be of a simple nature.

In each of the forms described hereinafter in detail, the drive arrangement includes an intermediate  
35 wheel of larger effective diameter than the drive wheel.

Preferably the carriage is one of two carriages and the door is one of two doors, the second of the two carriages being coupled to the second of the two doors and the other of the two runs of the endless band, each carriage moving with the endless runs from a doors open position in which the carriages are at opposite end portions of the two runs towards one another to a doors closed position.

10 The endless bands can be, for example, toothed or chain belts.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is a perspective view of major parts of a first form of door assembly;

Figure 2 is a side view of part of a second form of door assembly;

Figure 3 is a sectional view of the part of the door assembly shown in Figure 2;

Figure 4 is a side view of part of a third form of door assembly; and

25 Figure 5 is a sectional view of the part of the door assembly shown in Figure 4.

Referring first to Figure 1, in the door assembly illustrated there are two doors 1, 2 movable transversely of a doorway from relatively spaced apart open positions to adjacent closed positions. Each door 1, 2 is coupled to a respective overhead carriage 3, 4, wheels 5 of which run on an overhead track 6, the doors being made fast to the carriages by bolts 7 passed through keyhole slots 8 in the carriages and into threaded bushes in the doors. At one end of the carriage 3 there is a lock mechanism 9 (which will not

be described in detail) that co-operates with a lock bar 10 at one end of the carriage 4 and which can be manually released by a lever 11.

5        Each carriage 3, 4 is clamped to either the upper  
(carriage 3) or the lower (carriage 4) run of an  
endless band which in the assembly illustrated is an  
endless toothed belt 12. This clamping is effected by  
a clamp assembly 13 which, for each door, includes a  
10    toothed block 14 against which the belt 12 is clamped by  
a U-clamp 15 having one of its walls terminating in  
lugs 16 that engage in slots 17 in the block 14. The  
other wall of each U-clamp 15 terminates in a flange  
18 that is bolted to the block 14. Each block 14 is  
15    supported on a rod carried by a bracket 19 that is fast  
with the respective carriage 3 or 4, the block 14 being  
capable of limited sliding motion on its support rod  
against the resistance of a spring 20.

20        At each end of its runs the belt 12 runs around  
idler sprocket wheels 21, 22 that are supported by the  
track 6. In addition to passing around the idler  
sprocket wheel 21 at one end of the runs, the belt 12  
at this end of the runs also passes around a drive  
25    sprocket wheel 23 and a further idler wheel 24, the  
wheels 21, 23 and 24 being mounted on a face plate 25  
of a bearing block 26 that is bolted to the track 6. A  
bearing in the block 26 supports a common shaft 27 of  
the drive sprocket wheel 23 and a single sprocket wheel  
30    28 that is intermediate the drive sprocket wheel 23 and  
a prime mover that is a electric motor 29. The motor  
29 is controlled by a control unit 30, the motor 29 and  
its control unit 30 both being mounted on the track 6.  
The motor drives the intermediate sprocket wheel 28 via  
35    a toothed drive belt 31. The intermediate sprocket  
wheel 28 is of larger effective diameter than the drive  
sprocket wheel 23 to provide a desired gearing effect



in the drive assembly 32 that is constituted by the wheels 21, 23, 24 and 28 and the bearing block 26.

5 In open positions the doors 1, 2 are disposed remote from one another at opposite end portions of the two runs of the belt 12. To close the doors the motor 29 is run to drive the drive wheel 23 clockwise as viewed in Figure 1. The lower run of the belt 12 moves from right to left as viewed in Figure 1 and the upper 10 run moves from left to right. The carriages 3, 4 are drawn along the track 6 by the belt 12, moving with the doors 1, 2 towards one another until the doors reach central closed positions.

15 The forms of Figures 2 to 5 are in many respects similar to the form of Figure 1 and like parts are identified by like references.

In Figures 2 and 3 the sprocket wheel 21 of Figure 20 1 at one end of the runs of the belt 12 is replaced by a double sprocket wheel 21A/21B. The belt 12 passes around one wheel 21A of this double wheel and a secondary drive belt 32 passes around the other wheel 21B. The secondary drive belt 32 also passes around a 25 sprocket wheel 33 that is fast on the shaft 27 of the intermediate sprocket wheel 28 of this form. In this form the drive belt 31 between the motor 29 and the intermediate sprocket wheel 28 is a primary drive belt. Drive passes from the motor 29 via the primary drive 30 belt 31, the intermediate sprocket wheel 28, the sprocket wheel 33 and the secondary drive belt 32 to the double sprocket wheel 21A/21B to drive the endless belt 12, the sprocket wheel 21A serving as the driving wheel for the belt 12 in this form.

35 In the form of Figures 4 and 5 the sprocket wheel 21 at one end of the runs of the belt 12 is mounted on the

shaft 27 of the intermediate sprocket wheel 28 which is driven, as in the other forms, by the motor 29 via the drive belt 31. Thus in this form the sprocket wheel 21 serves as the drive wheel for the belt 12.

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It will be appreciated that door opening and closing is effected, in each of the forms of Figure 2 to 5, by driving the belt 12 as described with reference to Figure 1.

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In all the forms described the transmission of power from the motor 29 to the drive wheel 23 (Figure 1), 21A (Figures 2 and 3) or 21 (Figures 4 and 5) to drive the endless belt 12 to move the doors 1, 2 is achieved by a band and sprocket wheel drive arrangement that is of a simple nature.

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Although the bands described throughout are toothed belts it will be appreciated that chain belts could be utilised.

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CLAIMS

1. A door assembly comprising at least one door  
movable transversely of a doorway for opening and  
closing the doorway; a carriage coupled to the door and  
movable along a track extending transversely of the  
5 doorway; an endless band having two runs extending in  
the direction along the track, the carriage being  
coupled to one of these runs; and drive means for  
driving the endless band, this drive means comprising a  
drive wheel engaged with the endless band to drive the  
10 endless band and a prime mover connected to drive the  
drive wheel via a band and sprocket wheel drive  
arrangement.

2. A door assembly as claimed in Claim 1 wherein the  
15 carriage is one of two carriages and the door is one of  
two doors, the second of the two carriages being  
coupled to the second of the two doors and to the other  
of the two runs of the endless band, each carriage  
being for movement with the endless runs from a doors  
20 open position in which the carriages are at opposite  
ends of the two runs towards one another to a doors  
closed position.

3. A door assembly as claimed in Claim 1 or 2, wherein  
25 the drive arrangement includes an intermediate sprocket  
wheel of larger effective diameter than the drive  
wheel, driven by the prime mover via an endless band.

4. A door assembly as claimed in Claim 3, wherein the  
30 drive wheel and the intermediate sprocket wheel are  
mounted on a common shaft.

5. A door assembly as claimed in Claim 4, wherein the  
endless band between the prime mover and the  
35 intermediate sprocket wheel is the sole band of the

band and sprocket wheel drive arrangement.

5 6. A door assembly as claimed in any one of Claims 1 to 5, wherein the drive wheel is one of a plurality of wheels around which the band passes at one end of the two runs of the band.

10 7. A door assembly as claimed in any one of Claims 1 to 5, wherein the drive wheel is the only wheel around which the band passes at one end of the two runs of the band.

15 8. A door assembly as claimed in Claim 7 as appendant to any one of Claims 1 to 3, wherein the endless band between the prime mover and the intermediate sprocket wheel is a primary drive band, and wherein the band and sprocket wheel drive arrangement further includes a secondary endless drive band between a sprocket wheel fast with the intermediate sprocket wheel and a  
20 sprocket wheel fast with the drive wheel.

25 9. A door assembly substantially as hereinbefore described with reference to Figure 1, or Figures 2 and 3, or Figures 4 and 5 of the accompanying drawings.

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